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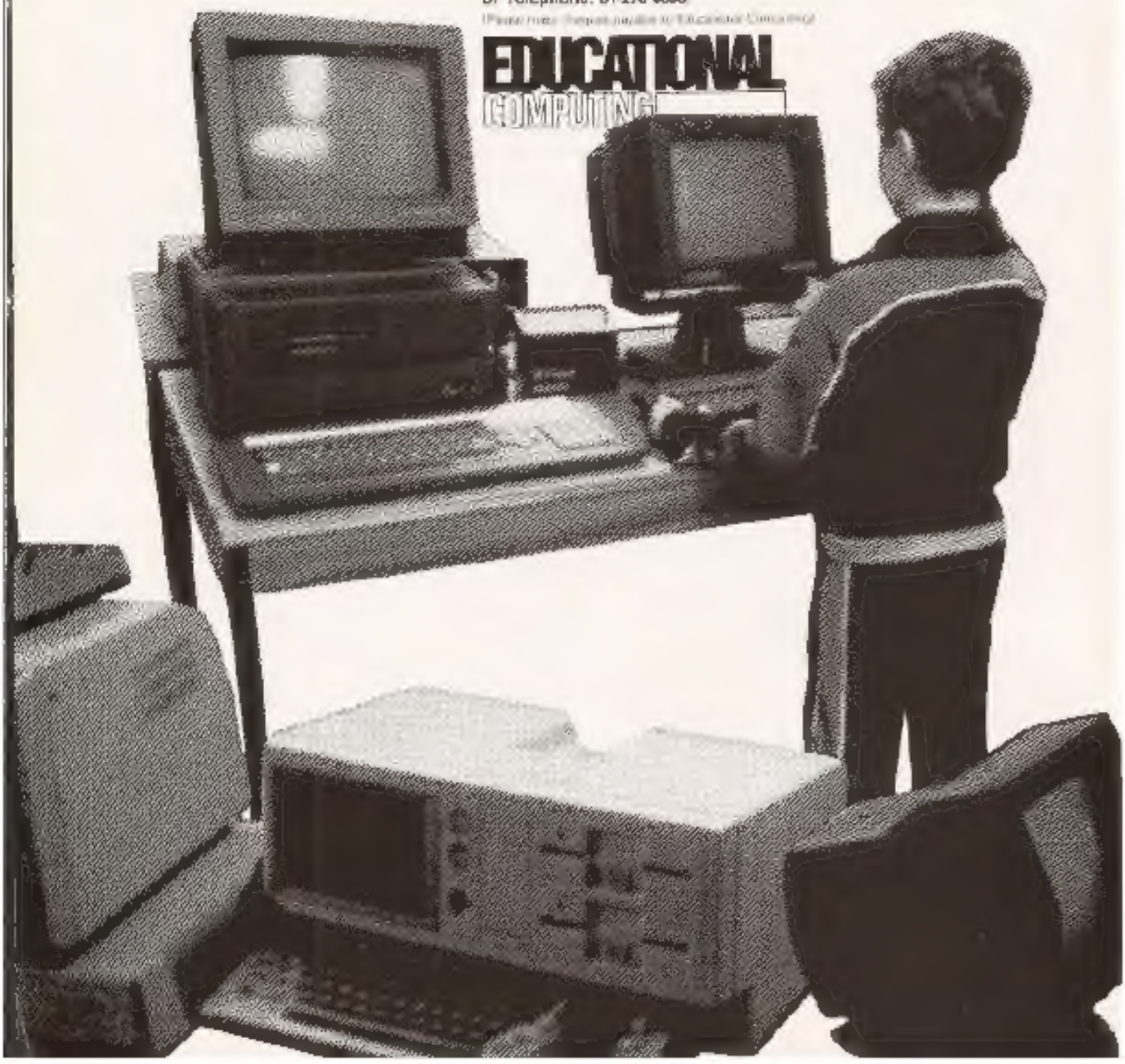

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IN TO

US Rival to QL Already?

At about the same time that Sinclair was introducing the QL onto an unsuspecting British market, an American company was showing a prototype system of a computer with a remarkably similar outline specification. That machine is the Lorraine, which is being developed by the Santa Clara, California joystick manufacturer, Amiga Corp.

A breadboard mock up of the computer was shown at the recent Consumer Electronics Show in Las Vegas, Nevada, and production versions could be available in the US soon.

The Lorraine is targeted to be an under-$1,000 machine. For this price, the user will get a computer built around three custom-designed integrated circuits and a 16-bit microprocessor.

It will have 128K bytes of memory as standard, together with a slot for programmable cartridges. A feature of these will be that the machine will be able to write to the cartridges, as well as read them.

Though the 16 bit processor has not been publicly specified as yet, it is likely to be either an Intel 8088 or a compatible device. This can be deduced from the fact that, though the Lorraine will have its own, proprietary operating system, just like the QL has its own, the computer will also be able to run "all major 16 bit operating systems", according to the company. Unlike the QL, secondary storage will be in the form of a conventional single floppy disc drive.

With 3,616 different colours, plus the ability to make real-time colour polygon fills and remove hidden lines, Amiga seems to be setting the Lorraine at the low end of the graphics work station market.

AUTO TRANSMISSION

This, of course, is the way the true professional goes about computing. Tucked up snug in the back of a brand new Daimler limousine, budgets and business plans can come as quickly as the miles go.

All this is one of the options available in the new range of Daimler limos recently introduced by British Leyland. Based on two specially configured Epson HX20 micros supplied to BL by STC Electronic Services and software developed by Talbot Computers, the system is designed for high-speed communications of all types, not least of which is 70 mph up the motorway.

Communication of both voice and data is via the car's built-in VHF radio telephone, so data can be transmitted to and from a host computer system if required.

The second HX20 is located in the front compartment of the car and is designated, according to the company, for secretarial purposes. This will allow the boss to sit in the back and make a mess of the spreadsheet all alone, with no one to know.

Soon you will be integrating an LA database from the Exeter bypass in your mini.

Lamp Makes Light of Insurance

There are nearly as many vertical market sectors in the professional computing marketplace as there are professional users. There are, however, several sectors where sufficient people are working to make the development of a new package attractive.

One such is insurance, and in particular the selling of life policies. That is why The Business House, a Cheltenham based systems house has produced LAMP, or Life Assurance Marketing Program. Developed in conjunction with Abbey Life, the package is based around an Epson HX-20 lap computer mounted in a briefcase.

Intended for use by Abbey Life's sales force, LAMP makes it possible to show a prospective client how much insurance is needed, and how much it will cost. It will also calculate the cash-in value of a policy for every year until its maturity.

Business House sees other applications of the HX-20 in similar areas to the LAMP system. Said Ray Blackman, a partner in the firm, "Sales people need not be afraid of it; it is something prospective clients can trust to provide accurate information in an understandable format."

LAMP is available for other sales applications for a cost of £260, complete with leather briefcase, and more information can be obtained on 0242 517856.

Teachers Create Edword

Edword is not a typing error, it is instead a word processing package that claims to be the first to have been specifically created by teachers for their pupils.

Marketed by Clwyd Technics, and produced under the auspices of the Government's Micros in Education Programme, the package has been designed to run on any BBC Micro using tape, disc or network for storage.

UCH

It requires no previous knowledge of word processing as all concepts, principles and techniques are fully explained as part of the tutorial element of the package. It also comes with a comprehensive HELP facility with full error messages.

To make it easy to use, multiple-key depressions are avoided, with all common functions being called up by a single keystroke. The editing, display and printing facilities are supported by a screen display that includes full status information.

The package comes with full documentation, a keyboard strip to identify function keys, and a 16K ROM that holds the software.

More details can be obtained by writing to the Edword Sales Dept of Clwyd Technics, Unit 4B, Antelope Industrial Estate, Rhydymwyn, nr Mold, Clwyd.

Wren — Unspectacular, But Right?

Get a British company, make it produce a new computer that features the faithful Zilog Z80 processor, a standard 64K bytes of memory, the CP/M operating system and a small display screen and one has the recipe for an unspectacular machine.

Put it all in a convenient portable box, and price it at under £1,000 and suddenly there is a computer that is much more interesting to the working professional.

Add to this basic package a built-in modem and communications software that directly interfaces the machine with such national networks as British Telecom's Prestel, and the Micronet 80 service, and the new Wren Executive System starts to look like a thorough package for its target users.

Those users are the growing army of professionals and executives that have a need for computing facilities while on the move. In this context, being technologically unspectacular is probably a distinct advantage.

By keeping the specification of the machine well within the bounds that are now considered 'ordinary', the Wren should gain the advantage of a reasonable degree of commonality with other systems installed and working in companies and organisations around the country.

This basic configuration of CP/M-based computer with common applications software, coupled to built-in communications and full portability should attract the interest of a wide range of corporate users of all types, where the Wren can be used as the remote end of the corporate network of systems.

Sales staff out on the road or executives working at home will have a tool through which they can communicate with any one of hundreds of different CP/M-based computer systems operating at home base.

Though technically unspectacular, the Wren system is comprehensive. Memory, for example, can be expanded from the standard 64K up to 256K bytes. The display is a 7 inch amber screen with three selectable formats. These are 80 x 24 Televideo TV1910 emulation, 40 x 24 Prestel emulation, and 512 x 256 high resolution graphics. These are supported by 96K bytes of dedicated memory.

Dual floppies are built-in, offering 200K bytes per drive storage capacity and it comes with a full set of I/O interfaces as well as the built-in modem.

In addition to CP/M Plus as the operating system, the Wren comes with a system of applications programs from Perfect Software. These include the Perfect Writer word processing package, the Perfect Calc spreadsheet, and Perfect Filer, which is a database system.

Other software bundled with the machine includes a time management package, a document creator, address program, a filing system and a program that allows the machine to emulate a typewriter.

On the communications side it has BBC Basic available, which will allow it to accept downloaded software from Micronet, together with the necessary software to allow such communications to take place.

Its main drawback is that suffered by all current full-featured portable computers: at just under 20lbs, the Wren is no pocket computer. The available features are, however, likely to compensate.

An interesting aspect of the Wren, and one that demonstrates a new and growing power behind many thrones in professional computing, is the fact that the machine is actually manufactured by Thorn-EMI, the same company that is producing the QL for Sinclair.

More information can be obtained on 01-253 2277.

IN TOUCH

Apple Puts on its Mackintosh

Since the introduction of the Apple II computer seven years ago, Apple has been for many the jewel in the crown of personal computing. Yet in that time it has launched two new computers that have failed to take over the mantle of market leadership that the Apple II gained.

Now the company has tried again with the launch of the Mackintosh, a new 16-bit computer that takes the technologies developed with the Lisa computer, hones them a little and repackages them in a new, lower cost form that takes the new machine into a head-on competition with the IBM Personal Computer.

The Lisa machine was introduced by Apple last year. Modelled closely on the Star system developed by Xerox, this included an operating system that offered screen windowing, and a mouse. It was Apple's second market failure (the first being the Apple III) for although a technologically significant machine, its $10,000 price tag put many customers off.

Despite price cuts and a loosening of corporate attitude over software supplies, the Lisa has failed to take off in the marketplace. The alternative string to Apple's bow however had been in development since before Lisa was launched — Mackintosh.

Here the basic hardware technology of Lisa is repackaged into a machine that will sell for the equivalent of around $3000. This package consists of a Motorola 68000 microprocessor coupled to 128K bytes of memory, a 3.5 inch floppy disc drive. It has a built in nine inch display, and weighs in at 17lbs, which makes it a 'transportable' machine.

The key differences about Mackintosh and most other computers in its price range are the windowing operating system from the Lisa, and the Mouse input system, also from the Lisa.

In a departure from the company's attitudes regarding software on the bigger system, Apple is now being free about who provides applications software for the machine. Apple in fact expects to provide less than 5 per cent of this, where it expected to provide it all when Lisa was launched.

Mackintosh is being introduced at an interesting time both for the market and for Apple. The company admits to the machine being a major gamble. Having failed in the marketplace twice, with the Apple III and with Lisa, Mackintosh has to sell heavily to maintain the company's position. The company has already lost much of its market to IBM, especially in the small business sector.

There are those that suspect that, despite a reputed $50m worth of advanced orders in the US, Mackintosh is in for a very tough fight, and perhaps a bloody nose. After all, the Sinclair QL offers the 68000 processor, 128K bytes of memory and windowing software in colour (Mackintosh is only in monochrome) at around a fifth of the price.

Certainly they are different machines aimed, ostensibly, at different sectors of the overall market. Price, however, is often the deciding factor when specifications are similar.

Osborne Surfaces With a PC Compatible

The financially troubled Osborne Computers may still reside under the protection of Chapter 11 of the US bankruptcy laws, but that hasn't stopped it coming up with a new IBM-PC compatible version of its portable computer.

Called the Osborne PC, it was given its world premier at the recent Which Computer? Show in Birmingham. It is claimed to be fully software and hardware compatible with the IBM machine, and Osborne's UK company set out to prove the point at the show by running Microsoft's Flight Simulator program. This is considered something of an acid test for PC compatibility claims.

Designed and developed by Osborne in the USA, the machine is being assembled from kits by the individual Osborne companies around the world.

It is similar to the Osborne Executive that was introduced by the company last year. Internally, however, there is no trace of the Executive's upgraded Osborne One machinery. The Executive was going to feature an MS-DOS/CP/M-86 level PC compatible add-on board, but now the company has scrapped this idea, and has gone for a full PC clone.

The target price is around £2,500.

Printers are tending to get cheaper all the time, just like systems. Here is one that, at £339, contains a broad range of interesting features. It is the Kaga/Taxan KP-810 dot matrix machine, which is being distributed by Data Efficiency in Hemel Hempstead. It includes a print rate of 140 characters per second, bi-directional logic seeking and an 80msec line feed. Data Efficiency claims that it can be made quieter than most printer systems by use of a half-speed mode. Data Efficiency is on 0442 60155.

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THE QL IN

£399 now brings you a very sleek, very slim computer whose power outmatches its price. Sinclair has provided so potent a successor to the Spectrum that the competition is reported to be quaking in its boots.

A full-size real action Qwerty keyboard, Sinclair's first, and onboard backing store of 200K bytes in the microdrives sets this way above his earlier machines by an order of magnitude.

The step Clive Sinclair has taken with the QL is rather akin to your local corner shop suddenly taking over Safeways. We journalists pride ourselves on knowing what is happening before anyone else, but even the most Sinclair-orientated of us had little idea that the machine was going to be this good and this cheap.

What do you get for your £400? Apart from the machine and all associated leads and manuals, four blank microdrives, and details of what is coming next, the package includes four excellent applications packages supplied on microdrive cartridge. All four were written by Psion, traditional suppliers of Sinclair software, and comprise a word processor called *QL Quill*, a database called *QL Archive*, a spreadsheet known as *QL Abacus* and a business graphics package, *QL Easel*. A fuller appraisal of these packages is to be found elsewhere in this magazine, but for software of this quality to be included in the entire package at this price is more than surprising.

The machine can drive a domestic television set, a colour monitor and a mono monitor. Sinclair says that using the QL in high resolution mode or using the stipple effect is not advisable if the output is directed to a normal television, as it is very unlikely that any could cope with the signal. Likewise, special TV text modes are provided, using 40 or 60 columns of text, as the maximum possible, (85 columns) is sure to be unreadable unless a monitor is to hand. Anyone who has used a BBC machine at home and attempted to use a word processor in one of its 80 column modes will understand the difficulty.

The machine comes with 128K of RAM, this being a sort of industry standard for 16-bit micros. Even allowing for the use of maximum screen resolution, this still leaves some 96K for the user, meaning that upwards of 80,000 characters can be stored and manipulated. There are very few circumstances under which a non-programmer would need more. After all, this is what microdrives are for.

If someone were writing a book, for instance, there is no reason why the entire manuscript should be kept in the computer at all times — why not store each individual chapter on drive? However, there are those who will need more room — especially software authors.

Sinclair will be bringing out a 500K add-on RAMpack in the not too distant future, and a very rough guess would place this in the around £200 category. If after this people still need extra memory then they should be computer-conversant enough to add it themselves.

On the extreme right of the machine are the two built-in microdrive slots. These provide 100K of storage each, with the provision to add up to six more. There has been a lot said about microdrives — some accuse them of being too slow, others

BRIEF

doubt their reliability, and some even say that they're too expensive.

Sinclair finally launched them in July last year as the most awaited peripheral for the Spectrum. We received a pre-production model shortly afterwards and used it extensively both for the purposes of review and during development of a game. During that whole period, we could only induce unreliability artificially by following unrecommended practices.

For example, Sinclair warns against switching on a machine if a Microdrive cartridge is in place, removing a cartridge during access, and switching the machine off when a cartridge is in the drive. We did all of these, and fifty percent of the time data corruption resulted. Apart from that, the drives and cartridges proved perfectly stable. However, shortly before we were due to return the drive to Sinclair it suddenly started reformatting cartridges, which is by no means a useful attribute.

Fortunately, later research proved this to be a fault in the interface we were given to connect the drive to a Spectrum. A full production model received later has so far shown none of these problems. We would place as much faith in microdrives as we do in conventional floppy disks — that is, we would always take backups of everything.

As for the speed of the devices there is no denying that they are slower than conventional disks, but in actual operation this becomes insignificant, especially as a system known as RAM buffering is used on the QL. This system stores parts of the drive data in the computer's memory and thus access times are faster than they would normally be. One real gripe is that the blank cartridges are too expensive.

Other expansion ports on the basic machine are two RS232 ports. These allow for connection of various devices such as printers and modems, the latter being devices that allow the QL to communicate via the phone lines with other computers. One application of this is British Telecom's Prestel service, along with Micronet 800, the extensive Sinclair-owned database. Here an oversight is highlighted. Prestel and Micronet operate in such a way that data is sent at a different rate to which it is received, and there does not seem to be any provision on the QL to allow for this. Possibly this can be altered in the software, or the provisional manual they have omissions.

At the back of the machine is a socket allowing the user to plug in ROM cartridges. ROM cartridges are programs that are permanently stored in a particular form of computer memory, and allow instant access of that program without having to wait for it to be loaded from microdrive. A similar facility was recently given to the Spectrum, and has proved itself as an ideal medium for distributing games and applications software.

The QL owner will also notice two 3.5mm jack sockets on the back of the machine labelled NET. These sockets allow the QL to be connected to up to 63 other QLs or ZX Spectrums in such a way that each can share the other's peripherals. This sort of system is ideal for applications in education, as only one printer and a few microdrives would be needed for the whole class. This network is extremely fast, information being passed between computers at approximately 10,000 bytes per second.

Also included on the QL are two joystick ports, allowing games to be controlled in a more playable fashion, or letting the screen cursor be controlled independently of the keyboard.

In all the QL is a system offering an amazing amount of power and facilities for a very low price. Watch IBM turn from blue to green.

Can the Microdrives cope with prolonged use?

QL SUPER

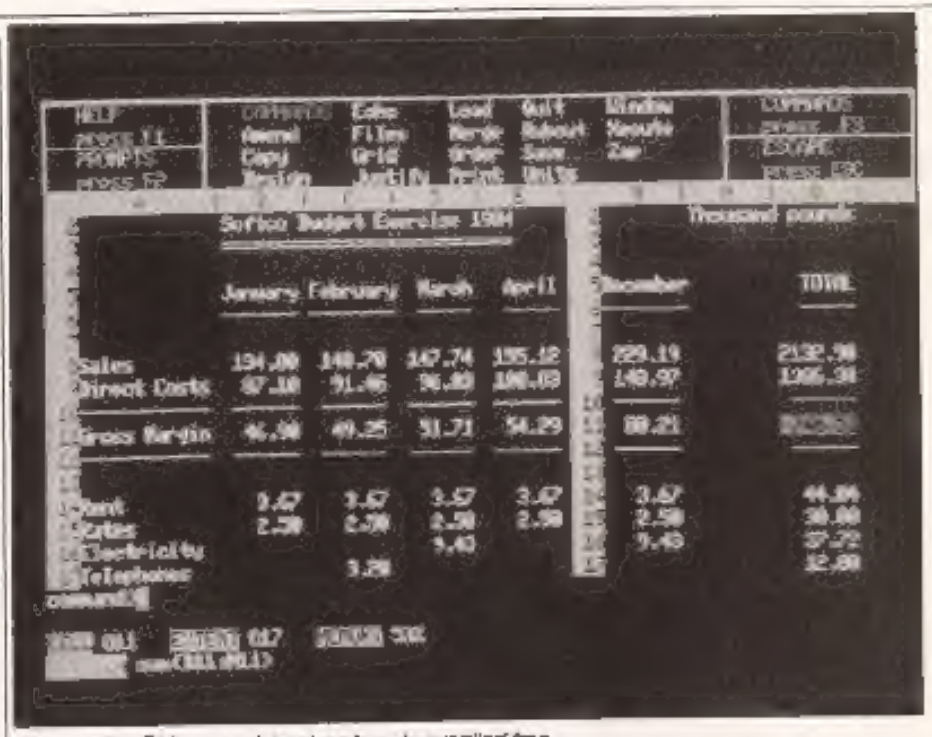
Adding structure

The QL computer, in common with most micros of the moment, comes equipped with a dialect of the Basic computing language. Sinclair calls this version SuperBasic, and the ability to observe it away from all the launch-day hype reveals that, as Basic dialects go, this one lives up to its name. Adopting strategies and structures from more advanced languages such as BCPL and C, QL's Super Basic has more to offer both the programmer and the less knowledgeable user than virtually any other dialect.

The most notable aspect of the language is that it has taken the best parts of Sinclair's earlier Spectrum Basic and added to them. Spectrum Basic was extremely individual, and was considerably more powerful than most in some respects, but a lot worse in others. Widely acclaimed for its unique string-handling capabilities, which were a complete departure from the Microsoft technique, this dialect offered no embarrassment to Spectrum owners.

It was extremely slow, however, and had none of the more advanced structured aspects of its keenest rival, Acorn's BBC Basic. For this it suffered, Acorn getting the prized BBC contract in preference to the Sinclair machines, and one-upmanship causing some immature BBC owners to laugh at Sinclair. In the event, Sinclair won the battle in the high street, the Spectrum scoring heavily over the more expensive Acorn machine in sales.

With SuperBasic, Clive and his cohorts ensured that the rivalry could not occur again. We have not yet been able to conduct any benchtests to compare the speed of the language against other versions, but the fact that it runs on a 68,000-based machine and has been adopted as the command language for the QDOS operating system indicates that it is no slowcoach.



Abacus, the QL's spreadsheet system, is supplied free.

The major differences between SuperBasic and other dialects will now be described, each individual keyword that represents an advance being discussed in detail. A keyword is a valid command or statement that is recognised by SuperBasic, and will be printed here in the same way as they are in the User Guide. Thus, the upper case parts of the keyword are the minimum abbreviations that the computer will accept, although the machine will cause each word to be printed in full on a listing.

ABS returns the absolute value of the following number or expression, that is, the number without its sign.

AUTO allows one to type in a program without having to generate the line numbers manually.

ATAN & ACOT compute the arctangent and the arccotangent respectively. The result is in radians.

BAUD allows the user to set the transmit and receive speeds of the two RS232 ports on the back of the computer. These ports are used for such devices as printers and modems, which allow the QL to be used as a terminal for services like Prestel. Although the two ports are set by the same BAUD statement, the baud rate is selectable between 75 and 19 200.

BEEP is the QL's sound command, and can be followed by a number of arguments to vary the pitch, duration and quality of the sound. It represents a great advance over the Spectrum's BEEP command, but as this machine is not primarily intended as a games unit, it doesn't offer quite the facilities of the BBC's comprehensive sound commands. However, one of the add-on units promised by Sinclair is a more advanced sound generator.

BLOCK is an advanced command that allows the user to fill a block of specified size and shape with a specified colour. The coordinates used are relative to the current window.

BORDER sets a border of specified colour and thickness around the current window.

CAT stands for catalogue and displays a list of all the files on the specified microdrive.

CHR will return the character whose value is specified as the parameter.

CIRCLE draws a circle or ellipse at a specified angle in a specified position on the screen. This seems to offer more than any comparable

R BASIC

to the argument

command or other

CLEAR clears out the variables area used by

CLOSE flushes all buffers associated with the specified newly written data to mic drive if appropriate then closes the channel
CLS clears the current window, or part of it, as specified by an optional

CODE is the inverse of **CHR$** and returns the value associated with a given

CONTINUE causes a program to continue from where it has been broken into
COPY copies data from one channel to another. Thus it can be used to display the on the screen or to copy a file from one microdrive to a

COS returns the cosine of the argument, which is assumed to be in radians
COT returns the cotangent of the given number
CSIZE specify within given limits, the size of the displayed characters. There are four options for the width and two for the height
CURSOR allows the cursor to be positioned anywhere in the

DATA allows data to be defined within a program in such a way that **READ** data to given variables.
DATE shows the extent to machine as having serious applications, as it returns the date and time a facility normally only seen on big

DEFine FUNction is an advanced derivation of the which allows the programmer to define his own functions. The SuperBasic version allows these functions to be spread across many program lines, and probably allows the function to be defined itself. Any number of parameters can be specified and type coercion means that of these parameters to be specified. An embodied **RETURN** statement specifies when and what answer the function returns to its caller. The end of the function definition is marked by an **END DEFine** statement.
DEFine PROCedure allows procedures, which are similar to functions but do not return a result, to be defined. Again with recursive possibilities. Procedures are called by

enter into is the same as the first

containing an **END DEFine** statement
DELETE

DIMension
specified. Integer, floating

DRAW is a graphics line to be rotated through an **DRAW**

EDIT invokes the screen editor and allows the specified program to be altered
EXEC is quite different from the **EXEC** command used by the BBC operating system. sequence of programs and executes them concurrently. Several communication pipes program so that they can communicate with each other if required. The command interpreter will still be active so that commands or even other programs can be typed in while all these programs
EXEC_W is the same as **EXEC** except that the invoked until the last program loaded has ended
EXIT is used to jump out of named repeat structures so that exceptional conditions can be used. This is equivalent to BCPL's BREAK
EXP returns the value of e to the power of the argument.
FLASH turns the flash state on and off, but note that it only has any effect in the low
FOR **FOR**
NEXT have been made so that a loop epilogue can be implemented using **END FOR**, and a list of variables for the control variable in a way understand from the information given in the manual. We will expand upon this aspect as soon as we

FORMAT sets up a blank suitable way for use.
GOTO & GOSUB are mentioned in the manual, but with comments saying that they are provided only for compatibility with other as they are

IF THEN ELSE/END IF this sequence of statements is an extension of the standard **IF THEN LOop**. Since providing **ELSE** for the first line in one of its clauses. So **END IF** when to consider the clause.
INK sets the colour with which to write in the current window.
REPeat/END REPeat allows for the formation of repeat structures, the **REPeat** being followed with an identifier so that loops can be nested without confusion.
AND numbers in varying form.
REMark allows unexecutable text to be inserted into a program, for comments etc.
RESTORE sets the data pointer to the specified program line, so that subsequent **READs** will start from the first **DATA** statement on or after that line.
PRINT sends output to the current channel in a variety of user-specified formats.
RANDOM allows the **RND** be reseeded.
PLOT sets a pixel to the current window using the WO

POKE fills a specified memory location with a specified value. The memory location can be chosen to be either a byte or a word (two bytes).

Continued on Page 12

QL SUPER BASIC

Adding structure to the argument

PAUSE causes a program to wait for the specified interval, in units of 20 milliseconds.
PEEK reads the value of a specified machine location, this being treated either as a byte or as a word, as for **POKE**.
PAPER sets the colour of the background of the screen.
PAN moves all or specified parts of the current window left or right by the specified amount in pixels.
OPEN opens a particular channel associated with a particular input/output device or file.
OVER selects the type of overprinting required.
NEXT apart from its obvious use in **FOR** loops, acts similarly to the LOOP statement in BCPL or RE Peat loops.
ON GOTO & ON GOSUB are provided for compatibility. They have been replaced in SuperBasic by the **SELect** statement, and that statement will be discussed in greater detail.
MODE selects the entire screen format.
NEW deletes the program in memory.
LRUN loads and runs a specified SuperBasic program stored on a specified Microdrive.
MERGE loads a SuperBasic program from a specified device and joins it to any program currently in memory.
LOCAL declares a variable used in a function or procedure to be local to that procedure, that is, no other part of the program can know of its existence.
LN & LOG return the natural logarithm and the logarithm to the base 10 of the number given respectively.
LIST causes all or specified parts of the current program to be listed to the specified channel.
LOAD will load a program from any specified QL device.
LEN returns the length (ie the number of characters) of a string.
LET is used in assigning variables. For the first time in a Sinclair Basic, it is optional.
INT returns the integer part of a floating point number.
INVERSE sets the screen printing in such a way that all subsequent output is printed in inverse.

INKEY gets a single character from the specified channel.
INPUT is basically the opposite of **PRINT**, in that it assigns a value to a variable, this value being taken from the current channel. Its syntax is very similar to **PRINT**.
RUN causes a program to start execution.
SAVE sends a program to any specified device such as a Microdrive.
SBYTES allows the user to save areas of the QL's memory.
SIN calculates the sine of a given number, which is assumed to be in radians.
SCALE allows graphics procedures to scale their output.
SCROLL moves the contents of the current window up or down by a specified number of pixels.
SELect/END SELect the statement is extremely powerful and allows the course of action to be selected by the value of a variable. It is very closely related to BCPL's SWITCHON and C's SWITCH, except that there is no ENDCASE. A whole series of lines can follow each value for the variable, so that wholly different actions can be taken. There is also a **DEFAULT** case, where action will be taken if the value does not match any of the **ON** cases. This is selected by **ON REMAINDER**. The lack of ENDCASE or its equivalent means that only one of these courses of action can be taken. However, unlike other languages, a range of values can be accounted for in one **ON** statement by use of the **TO** word.
SQRT returns the square root of the given number.
STOP causes a program to finish execution.
STRIP is a special kind of background effect that is used in conjunction with the **OVER** statement.
TAB moves the current printing position across by the specified number of character positions.
TAN computes the tangent of the argument.
TRACE allows the user to follow the course of a program. The output from this command can be sent to any specified channel.
UNDER causes subsequent printed output to be underlined.
USE specifies the default channels for **PRINT**, **INPUT** etc.
USR causes a machine code program at a specified address to be called.

We mentioned type coercion fairly often in the description above. In normal Basics, indeed in most languages, the type of a quantity or result must be specified in the programming statement. For instance, we must specify if an operation is to manipulate integers, floating point numbers or strings of characters. In SuperBasic, this is not always the case, and the machine will attempt to force the variable type to make sense of the operation being performed. As an example, we may want to add two numbers together and print the answer out. If numbers are received as two strings, say as and bs, in most Basics answer = as + bs would not make sense. In SuperBasic it would, so long as as and bs could be interpreted as numbers.

SuperBasic is then an extremely powerful dialect [illegible] of the earlier Sinclair Basic and safe from comparison with those of most other machines too. The only real competitor is BBC Basic, but this falls down in many respects. It is certainly good, but not as good as the newcomer. Many programmers have waited for a long time that Basic could be allowed to die — this new dialect might change their minds.

GETTING £2,500 INTO £400

While refusing to go into the extremes of sales hype all of us have agreed, the QL does score a lot of points over any rival.

The machine is a slim black unit some 15 or 16 inches long, 6 inches deep and 2 inches thick. In the box is one of the most powerful microprocessors yet built. This is the Motorola 68008, one of the 68000 family that has so won the favour of programmers and hardware engineers alike.

This processor is the one that does the majority of the computing, whilst an Intel 8049 processor controls the keyboard, generates the sound and handles the two RS232 receivers. This is not all. There are also two custom-designed chips that look after the memory, the microdrives, the real-time clock, the local area network and the RS232 transmitters.

Why the 68008? From a programmer's point of view the chip is powerful, easy to program and extremely fast.

From a hardware point of view the processor offers the capability to use an awful lot more memory than devices such as the Z80 used in Sinclair's earlier Spectrum. That machine was capable of addressing 64K of memory, which meant that as the systems software took up some 16K of this, one could store approximately 48000 characters in it. The 68000 in the QL, on the other hand, can address over one million bytes, which leaves the Spectrum standing.

Other advantages of this processor revolve around its immense speed and its 32 bit internal architecture. This piece of pure computer jargon simply means that it can manipulate numbers that are four times as big as a normal 8 bit machine uses.

Saying numbers four times as big does not imply that it on 8 bit chip can handle numbers up to 255 then the 68000 can handle numbers up to 1020, it means that the 68000 uses numbers up to 255 to the power of 4, which is in the region of a thousand million!

The QL actually uses the 68008, which worried competitors will point out is slightly less powerful than the Actual 68000. This is only partially true, as all it means is that the machine has to do everything connected with the external world twice, which admittedly slows it down.

The operating system is the program that controls the computer as a whole. It looks after everything from the keyboard to the sound, from the microdrives to the display. A powerful operating system is one that can do all these functions quickly and without being noticed by the user.

Prior to the launch of the QL, the most popular operating systems were the many versions of CP/M for Z80 based computers, MSDOS & PCDOS used on such things as the Apricot and the IBM PC, and Unix.

Unix was written in a very powerful language called C, and soon became very popular in America. Its main problems stem from its command syntax — that is, the language with which the user communicates with it.

This involved a lot of very brief and difficult to remember words surrounded by backslashes. No one except programmers really likes it, but until recently it was the best operating system there was. The QL has changed this.

The QL's operating system is the quaintly named QDOS, which is unique to Sinclair Research. The command language of QDOS is Sinclair's SuperBasic, which is considerably more friendly than Unix, but the power is retained.

Although at the time of writing very little information has been released on QDOS, it does seem to offer that which Unix fails to do. Both are multi-tasking operating systems — they allow more than one program to run at the same time, and both treat all input and output (that is, communication with the outside world) in basically the same way.

Without going into too much technicality, they are both based around block structured languages such as BCPL and C, but QDOS has evolved in a far more user orientated way than Unix. SuperBasic, which will be discussed in detail below, is in some respects closely related to C, the parent language of both, BCPL being developed in the same place as SuperBasic — Cambridge.

QDOS, like all real operating systems, is disc based, but another Sinclair innovation, microdrives, causes this to mean something a little different to most.

Microdrives are tiny cassette-like units that offer the speed of conventional floppy discs at a much lower price and at a much lower size. They are actually tape based, which does mean that they are slower than floppy discs, but QDOS and the application software get over this deficiency by using the computer's memory to hold a lot of the microdrive-based information.

Perhaps the most contentious points about microdrives are whether true random access can be implemented and whether they are reliable.

Random access is the ability to read from or write to any part of the files on the drive instantly.

In theory when using microdrives it is not possible, but as earlier mentioned, QDOS gets over this by storing drive data in memory — this is known as buffering, and is common practice even on conventional disc-based machines.

The second point, concerning reliability, is still in some respects an unknown factor.

The only solid evidence we have comes from experience with the earlier ZX Spectrum versions of the devices.

Here we have found that the production models are as reliable as floppy discs, but tend to be somewhat less robust — wearing out a little sooner. Considering the price of the cartridges and the promised easy availability, this presents no dire threat.

QDOS's main selling point over other operating systems must surely be its ability to set up and maintain windows.

To the user, this means that he can have, as a frivolous example, a chess game going on in one corner of the screen, with an action game such as Space Invaders being played in another.

QDOS can support at least 20 of these windows, and thus at least 20 concurrent programs, and while such an over-usage may have little point it is certainly worthwhile having the ability to run two or three programs together.

Windows are even more powerful in that each one can be set up with its own individual screen characteristics, so that each program can be differentiated by running in a differently coloured section of the screen, possibly with a coloured border for added separation.

The windows can also overlap each other, so that a slower but higher priority program can be running alongside a shorter program and then its output can be made more manifest by causing it to appear on top of whatever the user is doing.

Just when the City were beginning to lose faith in high tech and Sinclair's profits had not quite produced the required number of millions Sinclair Research have taken another leap. The age of the cheap personal computer has arrived. In 1984 Uncle Clive will be watching you watching him.

CONFUSED?Y

Puzzled by the mysterious world of the micro? Our new guide to the fundamentals of computing explores the murk to tell you what you need to know.

The good news is that micro computers need not be confusing. Unfortunately, all too many of those who understand them seem to feel a deep need to demonstrate their expertise by speaking a brand of jargon incomprehensible to the layman.

A guided tour of the illustration opposite may help things slot into place.

The screen on which your dialogue with the computer is displayed is known as the Visual Display Unit, or VDU for short.

An ordinary colour television set is frequently used by home computers, but for serious applications it is better to use a special "monitor". This costs more, but gives a much sharper, clearer picture, especially when the display is mostly text.

The VDU is where all the action seems to take place, but in reality the "brain" of the computer is the Central Processing Unit (CPU).

This usually resides in the keyboard unit, though, at the moment, there is a trend to have a detachable keyboard linked by a cable to the boxy CPU, which then sits under the VDU.

The CPU carries out the essential functions of the computer — simple arithmetic, remembering the information the user has fed in, and comparing numbers or letters.

The word "brain" should be used only with caution, since no computer of any size, let alone a micro, will be able to think as we do for a good few years, if ever.

To serve any useful purpose, a computer must have some information to work on, and some way of telling the user the result. The keyboard is a common "input device" (for putting information in), and the VDU is a common "output device".

Other I/O (input/output)

OU WON'T BE

devices include printers, voice synthesisers, telephones, and digital tracers (which let you trace something with a pantograph arm to get the shape into the computer's memory.

The telephone is now being used more and more to send programs and information from one computer user to another.

The only special equipment required is a modem (modulator/demodulator), which converts the computer's output into a series of electronic bleeps or vice-versa.

Despite all this technical hardware, a newly switched-on computer is like a newly-born baby. It has great potential, but is completely useless.

The hardware can only act according to a strict set of precise instructions called software. The software program can be fed in by almost any input device, but it must be entered every time the computer is switched on.

This is because most computers forget their programs and data when the power is cut.

The computer's internal memory is divided into two areas, RAM and ROM. RAM, or Random Access Memory, can have its contents read or written very easily by the user, and it is into RAM that "user programs" are entered.

However, since most users are not computer genii capable of entering programs in the language understood by the CPU — machine code, a series of on-off pulses — most manufacturers give their machines an area of ROM, or Read Only Memory.

ROM is permanent, and not affected by switching off, so it is used to hold a "high level language", meaning "close to English". BASIC is the most popular of these, and most types of computer have a slightly different dialect.

The BASIC interpreter translates each line of the user program into machine code before executing it.

The other resident of ROM is the "operating system". This is the machine equivalent of the Civil Service, acting as an administrator of the entire system, and generally handling the way the software makes the hardware behave.

The memory of a computer is measured in "bytes". A byte is a group of zeros and ones in a certain order which identifies the byte as representing a certain character (a letter or digit). 1024 bytes is called a Kilobyte, usually abbreviated to K.

One K of memory will hold a couple of hundred words, so this entire article is about 7K in size.

It's almost essential to have some means of storing the programs and data you use on your micro. The trusty cassette recorder is the mainstay of the home user, using ordinary audio tapes to record.

The process of loading or saving a program with a cassette takes a few minutes, so business computers normally use something a bit faster.

A "floppy disk drive" does everything a cassette recorder does plus a few extra tricks, but its main advantage is speed.

The removable disk looks square, because it is protected by a stiff cardboard sleeve. It can load a program in only a few seconds.

A "winchester disk" or "hard disk" is another step up — it will hold a vast amount of information, often twenty megabytes (over 20,000K) and can access the data very quickly indeed.

The only problems are the expense and the fact that, when the disk is full, you have to buy another unit, the disks themselves not being interchangeable.

When deciding which micro to buy, you should work out exactly what you will use it for before you go out with cheque-book in hand.

The potential home user may well find this easier than his counterpart in business, since his needs will be similar to those of thousands of other users.

It might be worth bearing in mind that most home computers spend their lives playing games, no matter how serious the stated intentions of their buyers to learn programming and computerise their bill-paying.

Consequently, the ability to display good graphics should not be ignored, nor should the amount of good software actually available and on the shelves of the computer shops.

The availability and cost of any peripherals you may want should be a key factor, especially if these add-ons are promised as "coming soon".

Computer manufacturers work on a different timescale from the rest of us, and "soon" may well mean "in about twelve months' time, if at all".

As a general rule, if you can't buy it this week, assume that it isn't available.

For the business user, choosing a computer is a rather more difficult task. It is usually better to choose the software first, and then cast around for a computer which will run it to your satisfaction, but either way, the first step should be to discuss your potential application with a consultant or reputable dealer.

BUYER'S CHECKLIST

1 What happens if it breaks down?

2 Can I understand the documentation, and does it tell me everything I need to know?

3 If I need to upgrade the system, what inconvenience/delay/loss of use will I experience?

4 Is everything I need available now, or is it just "coming soon"?

5 Can I have a demonstration of the complete system, peripherals and software included, before I part with my money?

6 Is the system approved by the magazines which have tested it?

7 Is the dealer helping? Does he offer proper hardware and software support? Are the staff knowledgeable, or would I be on my own, with any problems that develop?

QL for the OU?

We investigate the value of the QL in schools and universities, including news of how the Open University is planning to explore the theme.

The Next Wave

We talk to Sinclair and Acorn about their new generation micros.

PC versus QL

Taking a standard IBM PC and a standard Sinclair QL we find out if it is really possible for Sinclair to invade the territory of the Jolly Blue Giant.

CLEAR VISION

What type of tv/monitor suits your needs best?

COMING SOON